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DEPT FOR AF/S, NP/RA/CMARTIN AND WHAMMACK
ENERGY FOR NE-2.4, AND
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SUBJECT: SOUTH AFRICA: KOEBERG POWER PLANT EXPERIENCING
PROBLEMS

¶1. (U) Summary. Eskom is racing against the clock to repair the generator connected to one of two nuclear reactors at its Koeberg power plant located north of Cape Town. Eskom shut down the Koeberg 1 reactor following damage to its dedicated generator reportedly caused when a maintenance team inadvertently left a three-inch bolt inside. The problem is that spare parts are not kept in inventory, and used ones are difficult to find. Eskom has its fingers crossed that Koeberg 2 stays in operation long enough for the damaged generator to be repaired. Koeberg 2 is scheduled for refueling in March, but this perhaps can be stretched to April or the beginning of May. In the meantime, any major power surge on the 900-mile transmission lines from Mpumalanga could trip Koeberg 2 and blackout the Cape. The incident, which occurred on Christmas Day, followed a spate of power interruptions in the Cape during the month of November. End Summary.

¶2. (U) Eskom is racing against the clock to repair the generator connected to one of two nuclear reactors at its Koeberg power plant located north of Cape Town. Koeberg reactors 1 and 2 are responsible for supplying the Cape with 1800 MW of power, and are crucial to stabilizing additional power transmitted over 900 miles of high voltage transmission lines from coal-fired stations in Mpumalanga Province, east of Johannesburg. The loss of Koeberg 1 means that the stability of these long distance lines rests primarily with Koeberg 2. If Koeberg 2 were to shut down, Cape Town would experience chronic blackouts.

¶3. (U) When one of the Koeberg reactors shuts down, Eskom normally switches on the 60 MW Acacia gas turbine in the Western Cape and the Port Rex gas turbine in the Eastern Cape. In this case, Eskom has also activated its pumped storage power station at Palmiet and its hydroelectric station at Van der Kloof. But these plants together do not generate nearly enough base power to run the Cape. As a consequence, Eskom has taken urgent steps to put the mothballed Athlone and Steenberg power stations back into operation. Prior to this incident, Eskom had already tendered for the construction of two combined cycle generation plants in Atlantis and Mossel Bay, to be completed by the end of 2007. In addition, Eskom was in the middle of a \$200 million project to upgrade its high voltage transmission lines from Mpumalanga.

¶4. (U) The immediate problem for Koeberg 1 is that spare parts needed for the French built generator (Alstom) are not kept in inventory, and used ones are difficult to find. To order and import a new generator would take a year. Given these options, Eskom had little choice but to truck the massive generator parts to Rotek Engineering, its subsidiary

in Johannesburg, for repair. Ideally, Rotek should complete the task before Koeberg 2 shuts down for refueling in March. However, refueling could be stretched until the end of April or the beginning of May, if sanctioned by the National Nuclear Regulator. In the meantime, Eskom must keep its fingers crossed that nothing else goes wrong. Any major power surge on the Mpumalanga transmission lines could cause Koeberg 2 to trip, leading to a blackout for most of the Cape.

¶5. (U) The problem with the generator for Koeberg 1 is not an isolated incident. It follows a spate of power interruptions in the Cape during the month of November. On November 11, a black out was caused by a mechanical failure in the transmission lines in Koeberg's switching gear. On November 16, a fire under transmission lines caused a power cut that led to a controlled shut down at Koeberg. On November 23, Koeberg instigated another controlled shutdown (this time without power interruption) after routine checks found that the chemical concentration in its safety injection system was below specification. Throughout, the situation was complicated by the fact that Koeberg 1 was already down for refueling -- in winter when the voltage from Mpumalanga is low. When Koeberg 1 was brought back on-line on December 25, its generator soon faulted, thus tripping another controlled shutdown.

¶6. (U) The culprit appears to have been a member of the maintenance team who reportedly has assumed responsibility for inadvertently leaving a three-inch bolt inside the generator for Koeberg 1. When the generator was activated, the bolt ripped through both the rotor and the stator, a sophisticated series of thick electric cables. The bolt damaged the insulation surrounding the generator bars of the stator, causing an electrical fault and forcing the controlled shutdown of Koeberg 1.

¶7. (U) Cape Town was already feeling a power pinch when all of these outages happened. City Council Public Lighting Manager Charles Kadalie had warned that controlled power interruptions could plague the city during the next three to nine months, in line with the project to upgrade the transmission lines. He wanted to shut off streetlights that burned during the day to prevent cable theft, but first he would have to bury the cables in cement. He also wanted to turn off the nightly illumination of Table Mountain and advised Cape residents to conserve electricity.

¶8. (U) The power interruptions and controlled shutdowns in November have attracted the attention of the National Energy Regulator (NER), which has asked Eskom to investigate the underlying causes. NER had also commissioned the first independent technical audit of Eskom's transmission business.

Some have speculated that the 20-year old power plant at Koeberg may need an overhaul. Others have speculated that the loss of experienced staff, including Koeberg's long-serving Power Station Manager, may be the source of future problems at Koeberg.

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